

Amendments to the Claims

This listing of the Claims will replace all prior versions and listings of the claims in this patent application.

Listing of the Claims

Claims 1-10 (canceled)

11. (previously presented) A method of fabricating an electronic package comprising the steps of:

separating a wafer into multiple dies;

after said separating said wafer, joining one of said dies and a substrate, wherein an opening in said substrate exposes said one of said dies;

depositing a solder ball into said opening; and

after said joining said one of said dies and said substrate, separating said substrate into multiple portions.

12. (previously presented) The method of claim 11, further comprising depositing a UBM layer over a pad of said wafer, followed by said separating said wafer, followed by said joining said one of said dies and said substrate, wherein said opening in said substrate exposes said UBM layer.

13. (previously presented) The method of claim 11, wherein said opening is formed in said substrate before said joining said one of said dies and said substrate.

Claim 14 (canceled)

15. (previously presented) The method of claim 11, wherein said one of said dies comprises a pad and a passivation layer, an opening in said passivation layer exposing said pad, and wherein said opening in said substrate exposes said pad.

Claim 16 (canceled)

17. (previously presented) The method of claim 11, wherein said one of said dies comprises a first pad, a second pad and a passivation layer, an opening in said passivation layer exposing a top surface of said second pad, said first pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad, said opening in said substrate exposing said first pad.

Claim 18 (canceled)

19. (previously presented) The method of claim 11 further comprising depositing an adhesive material over said substrate, followed by said joining said one of said dies and said substrate using said adhesive material.

20. (previously presented) The method of claim 11, after said joining said one of said dies and said substrate, further comprising depositing a polymer layer encapsulating said one of said dies.

Claims 21 and 22 (canceled)

23. (previously presented) The method of claim 11, wherein said substrate comprises bismaleimide triazine (BT).

24. (previously presented) The method of claim 11, wherein said solder ball comprises tin-silver alloy.

25. (previously presented) The method of claim 11, wherein said opening is formed using a process comprising mechanical drilling.

Claims 26-41 (canceled)

42. (previously presented) A method of fabricating an electronic package comprising the steps of:

depositing an adhesive material over a substrate;

joining a die and said substrate using said adhesive layer, wherein an opening in said substrate exposes said die; and

after said joining said die and said substrate, separating said substrate into multiple portions.

43. (previously presented) The method of claim 42, wherein said die comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening exposes said UBM layer.

44. (previously presented) The method of claim 42, wherein said die comprises a pad and a passivation layer, an opening in said passivation layer exposing said pad, and wherein said opening in said substrate exposes said pad.

45. (previously presented) The method of claim 42, wherein said die comprises a first pad, a second pad and a passivation layer, an opening in said passivation layer exposing a top surface of said second pad, said first pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad, said opening in said substrate exposing said first pad.

46. (previously presented) The method of claim 42, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

47. (previously presented) The method of claim 42, wherein said substrate has a thickness of between 150 and 300 microns.

48. (previously presented) The method of claim 42, wherein said opening is formed in said substrate before said joining said die and said substrate.

49. (previously presented) The method of claim 42, wherein said substrate comprises bismaleimide triazine (BT).

50. (previously presented) The method of claim 42, after said joining said die and said substrate, further comprising depositing a conductive material into said opening.

51. (previously presented) The method of claim 50, wherein said conductive material comprises solder.

52. (previously presented) A method of fabricating an electronic package comprising the steps of:

providing a die comprising a UBM layer and a first pad, said UBM layer being over said first pad; and

joining said die and a substrate, wherein an opening in said substrate exposes said UBM layer.

53. (previously presented) The method of claim 52, after said joining said die and said substrate, further comprising depositing a conductive material into said opening.

54. (previously presented) The method of claim 53, wherein said conductive material comprises solder.

55. (previously presented) The method of claim 52, wherein said die comprises a passivation layer, an opening in said passivation layer exposing said first pad.

56. (previously presented) The method of claim 52, wherein said die comprises a second pad and a passivation layer, an opening in said passivation layer exposing a top surface of said second pad, said first pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad.

57. (previously presented) The method of claim 52, after said joining said die and said substrate, further comprising separating said substrate into multiple portions.

58. (previously presented) The method of claim 52, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

Claim 59 (canceled)

60. (previously presented) The method of claim 52 further comprising depositing an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

61. (previously presented) The method of claim 52, wherein said opening is formed in said substrate before said joining said die and said substrate.

62. (previously presented) The method of claim 52, wherein said UBM layer comprises copper.

63. (currently amended) A method of fabricating an electronic package comprising the steps of:

joining a die, separated from a wafer, and a substrate, wherein an opening in said substrate exposes a topmost patterned circuit layer of said die; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said topmost patterned circuit layer to an external circuitry; and

after said joining said die and said substrate, separating said substrate into multiple portions.

64. (previously presented) The method of claim 63, wherein said conductive material comprises solder.

65. (previously presented) The method of claim 63, wherein said conductive material comprises tin-lead alloy.

66. (previously presented) The method of claim 63, wherein said external circuitry comprises a next level of packaging.

67. (previously presented) The method of claim 63, wherein said topmost patterned circuit layer comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening in said substrate exposes said UBM layer.

68. (previously presented) The method of claim 63, wherein said die comprises a passivation layer, an opening in said passivation layer exposing a pad of said topmost patterned circuit layer, and wherein said opening in said substrate exposes said pad.

69. (previously presented) The method of claim 63, wherein said die comprises a first pad and a passivation layer, an opening in said passivation layer exposing a top surface of said first pad, and wherein said topmost patterned circuit layer comprises a second pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad, said opening in said substrate exposing said second pad.

Claim 70 (canceled)

71. (previously presented) The method of claim 63, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

Claim 72 (canceled)

73. (previously presented) The method of claim 63 further comprising depositing an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

74. (previously presented) The method of claim 63, wherein said opening is formed in said substrate before said joining said die and said substrate.

75-101. (Canceled)

102. (previously presented) A method of fabricating an electronic package comprising the steps of:

depositing a UBM layer over a first pad of a wafer;

separating said wafer into multiple dies;

joining one of said dies and a substrate, wherein an opening in said substrate exposes said UBM layer; and

depositing a conductive material into said opening.

103. (previously presented) The method of claim 102, wherein said conductive material comprises solder.

104. (previously presented) The method of claim 102, wherein said wafer comprises a passivation layer, an opening in said passivation layer exposing said first pad.

105. (previously presented) The method of claim 102, wherein said wafer comprises a second pad and a passivation layer, an opening in said passivation layer exposing a top surface of said second pad, said first pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad.

106. (previously presented) The method of claim 102, after said depositing said conductive material, further comprising separating said substrate into multiple portions.

107. (previously presented) The method of claim 102, after said joining said one of said dies and said substrate, further comprising depositing a polymer layer encapsulating said one of said dies.

108. (Canceled)

109. (previously presented) The method of claim 102, further comprising depositing an adhesive material over said substrate, followed by said joining said one of said dies and said substrate using said adhesive material.

110. (previously presented) The method of claim 102, wherein said opening is formed in said substrate before said joining said one of said dies and said substrate.

111. (previously presented) The method of claim 102, wherein said UBM layer comprises copper.

112-116. (Canceled)

117. (previously presented) A method of fabricating an electronic package comprising the steps of:

providing a die comprising a passivation layer and a metal layer, said metal layer being over said passivation layer; and

joining said die and a substrate, wherein an opening in said substrate exposes said metal layer.

118. (previously presented) The method of claim 117, wherein said opening is formed in said substrate before said joining said die and said substrate.

119. (previously presented) The method of claim 117, wherein said metal layer comprises a UBM layer.

120. (previously presented) The method of claim 119, wherein said UBM layer comprises copper.

121. (previously presented) The method of claim 117, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

122. (Canceled)

123. (previously presented) The method of claim 117 further comprising depositing an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

124. (previously presented) The method of claim 117, after said joining said die and said substrate, further comprising depositing a conductive material into said opening.

125. (previously presented) The method of claim 124, wherein said conductive material comprises solder.

126. (previously presented) The method of claim 117, wherein said die further comprises a pad exposed by an opening in said passivation layer, said metal layer connected to said pad.

127. (currently amended) A method of fabricating an electronic package comprising the steps of:

providing a die, separated from a wafer, comprising a pad and a passivation layer, an opening in said passivation layer exposing said pad; and

depositing an adhesive material over said substrate; and
joining said die and a substrate using said adhesive material, an opening in said substrate exposing said pad.

128. (previously presented) The method of claim 127, wherein said opening is formed in said substrate before said joining said die and said substrate.

129. (previously presented) The method of claim 127, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

Claims 130 and 131 (canceled)

132. (previously presented) The method of claim 127, after said joining said die and said substrate, further comprising depositing a conductive material into said openings.

133. (previously presented) The method of claim 132, wherein said conductive material comprises solder.

134. (previously presented) A method of fabricating an electronic package comprising the steps of:

separating a wafer into multiple dies;

after said separating said wafer, joining one of said dies and a substrate, an opening in said substrate exposing said one of said dies; and

after said joining said one of said dies and said substrate, separating said substrate into multiple portions.

135. (previously presented) The method of claim 134 further comprising depositing a UBM layer over a pad of said wafer, followed by said separating said wafer, followed by said joining said one of said dies and said substrate, wherein said opening exposes said UBM layer.

136. (previously presented) The method of claim 134, wherein said opening is formed in said substrate before said joining said one of said dies and said substrate.

137. (previously presented) The method of claim 134, wherein said one of said dies comprises a pad and a passivation layer, an opening in said passivation layer exposing said pad, and wherein said opening in said substrate exposes said pad.

138. (previously presented) The method of claim 134, wherein said one of said dies comprises a first pad, a second pad and a passivation layer, an opening in said passivation layer exposing a top surface of said second pad, said first pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad, said opening in said substrate exposing said first pad.

139. (previously presented) The method of claim 134 further comprising depositing an adhesive material over said substrate, followed by said joining said one of said dies and said substrate using said adhesive material.

140. (previously presented) The method of claim 134, after said joining said one of said dies and said substrate, further comprising depositing a polymer layer encapsulating said one of said dies.

141. (previously presented) The method of claim 134, wherein said substrate has a thickness of between 150 and 300 microns.

142. (Canceled)

143. (previously presented) The method of claim 134, wherein said substrate comprises bismaleimide triazine (BT).

144. (previously presented) The method of claim 134, after said joining said one of said dies and said substrate, further comprising depositing a conductive material into said opening.

145. (previously presented) The method of claim 134, wherein said opening is formed using a process comprising mechanical drilling.

146. (previously presented) The method of claim 11, wherein said opening is formed using a process comprising laser drilling.

147. (previously presented) The method of claim 11, wherein said substrate has a thickness of between 150 and 300 microns.

148. (previously presented) The method of claim 12, wherein said UBM layer comprises copper.

149. (previously presented) The method of claim 12, wherein said UBM layer comprises nickel.

150. (previously presented) The method of claim 12, wherein said UBM layer has a thickness of between 1 and 50 microns.

151. (previously presented) The method of claim 42, wherein said opening is formed using a process comprising laser drilling.

152. (previously presented) The method of claim 42, wherein said opening is formed using a process comprising mechanical drilling.

153. (previously presented) The method of claim 43, wherein said UBM layer comprises copper.

154. (previously presented) The method of claim 43, wherein said UBM layer comprises nickel.

155. (previously presented) The method of claim 43, wherein said UBM layer has a thickness of between 1 and 50 microns.

156. (previously presented) The method of claim 52, wherein said UBM layer comprises nickel.

157. (previously presented) The method of claim 52, wherein said UBM layer has a thickness of between 1 and 50 microns.

158. (previously presented) The method of claim 52, wherein said substrate has a thickness of between 150 and 300 microns.

159. (previously presented) The method of claim 52, wherein said opening is formed using a process comprising laser drilling.

160. (previously presented) The method of claim 52, wherein said opening is formed using a process comprising mechanical drilling.

161. (previously presented) The method of claim 52, wherein said substrate comprises bismaleimide triazine (BT).

162. (previously presented) The method of claim 67, wherein said UBM layer comprises copper.

163. (previously presented) The method of claim 67, wherein said UBM layer comprises nickel.

164. (previously presented) The method of claim 67, wherein said UBM layer has a thickness of between 1 and 50 microns.

165. (previously presented) The method of claim 63, wherein said substrate has a thickness of between 150 and 300 microns.

166. (previously presented) The method of claim 63, wherein said opening is formed using a process comprising laser drilling.

167. (previously presented) The method of claim 63, wherein said opening is formed using a process comprising mechanical drilling.

168. (previously presented) The method of claim 63, wherein said substrate comprises bismaleimide triazine (BT).

169. (previously presented) The method of claim 102, wherein said UBM layer comprises nickel.

170. (previously presented) The method of claim 102, wherein said UBM layer has a thickness of between 1 and 50 microns.

171. (previously presented) The method of claim 102, wherein said substrate has a thickness of between 150 and 300 microns.

172. (previously presented) The method of claim 102, wherein said opening is formed using a process comprising laser drilling.

173. (previously presented) The method of claim 102, wherein said opening is formed using a process comprising mechanical drilling.

174. (previously presented) The method of claim 102, wherein said substrate comprises bismaleimide triazine (BT).

175. (previously presented) The method of claim 119, wherein said UBM layer comprises nickel.

176. (previously presented) The method of claim 119, wherein said UBM layer has a thickness of between 1 and 50 microns.

177. (previously presented) The method of claim 117, wherein said substrate has a thickness of between 150 and 300 microns.

178. (previously presented) The method of claim 117, wherein said opening is formed using a process comprising laser drilling.

179. (previously presented) The method of claim 117, wherein said opening is formed using a process comprising mechanical drilling.

180. (previously presented) The method of claim 117, wherein said substrate comprises bismaleimide triazine (BT).

181. (previously presented) The method of claim 127, wherein said substrate has a thickness of between 150 and 300 microns.

182. (previously presented) The method of claim 127, wherein said opening is formed using a process comprising laser drilling.

183. (previously presented) The method of claim 127, wherein said opening is formed using a process comprising mechanical drilling.

184. (previously presented) The method of claim 127, wherein said substrate comprises bismaleimide triazine (BT).

185. (previously presented) The method of claim 135, wherein said UBM layer comprises copper.

186. (previously presented) The method of claim 135, wherein said UBM layer comprises nickel.

187. (previously presented) The method of claim 135, wherein said UBM layer has a thickness of between 1 and 50 microns.

188. (previously presented) The method of claim 134, wherein said opening is formed using a process comprising laser drilling.

189. (new) A method of fabricating an electronic package comprising the steps of:

joining a die, separated from a wafer, and a substrate, wherein an opening in said substrate exposes a topmost patterned circuit layer of said die; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said topmost patterned circuit layer to an external circuitry, wherein said conductive material comprises solder.

190. (new) The method of claim 189, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

191. (new) The method of claim 189, wherein said topmost patterned circuit layer comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening in said substrate exposes said UBM layer.

192. (new) The method of claim 191, wherein said UBM layer comprises copper.

193. (new) The method of claim 191, wherein said UBM layer comprises nickel.

194. (new) The method of claim 191, wherein said UBM layer has a thickness of between 1 and 50 microns.

195. (new) A method of fabricating an electronic package comprising the steps of:

providing a die comprising a first pad, a passivation layer and a circuit layer over said passivation layer, an opening in said passivation layer exposing a top surface of said first pad, wherein said circuit layer comprises a second pad connected to said top surface, the position of said first pad from a top view being different from that of said second pad;

joining a die, separated from a wafer, and a substrate, wherein an opening in said substrate exposes said second pad; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said second pad to an external circuitry.

196. (new) The method of claim 195, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

197. (new) A method of fabricating an electronic package comprising the steps of:

depositing an adhesive material over a substrate;

after said depositing said adhesive material, joining a die, separated from a wafer, and a substrate using said adhesive material, wherein an opening in said substrate exposes a topmost patterned circuit layer of said die; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said topmost patterned circuit layer to an external circuitry.

198. (new) The method of claim 197, wherein said topmost patterned circuit layer comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening in said substrate exposes said UBM layer.

199. (new) The method of claim 198, wherein said UBM layer comprises copper.

200. (new) The method of claim 198, wherein said UBM layer comprises nickel.

201. (new) The method of claim 198, wherein said UBM layer has a thickness of between 1 and 50 microns.

202. (new) The method of claim 197, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

203. (new) A method of fabricating an electronic package comprising the steps of:

forming an opening in said substrate;

after said forming said opening, joining a die, separated from a wafer, and said substrate, wherein said opening exposes a topmost patterned circuit layer of said die; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said topmost patterned circuit layer to an external circuitry.

204. (new) The method of claim 203, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.

205. (new) The method of claim 203, wherein said topmost patterned circuit layer comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening in said substrate exposes said UBM layer.

206. (new) The method of claim 205, wherein said UBM layer comprises copper.

207. (new) The method of claim 205, wherein said UBM layer comprises nickel.

208. (new) The method of claim 205, wherein said UBM layer has a thickness of between 1 and 50 microns.

209. (new) A method of fabricating an electronic package comprising the steps of:

providing a die comprising a circuit layer with a UBM layer and a pad, said UBM layer being over said pad;

joining said die, separated from a wafer, and a substrate, wherein an opening in said substrate exposes said UBM layer; and

depositing a conductive material into said opening, wherein said conductive material is used to connect said topmost patterned circuit layer to an external circuitry.

210. (new) The method of claim 209, wherein said UBM layer comprises copper.

211. (new) The method of claim 209, wherein said UBM layer comprises nickel.

212. (new) The method of claim 209, wherein said UBM layer has a thickness of between 1 and 50 microns.

213. (new) The method of claim 209, after said joining said die and said substrate, further comprising depositing a polymer layer encapsulating said die.